

AD-A216 338

U S A T H A M A

U.S. Army Toxic and Hazardous Materials Agency

Enhanced Preliminary Assessment Report:

Clementon Army Housing Units Clementon, New Jersey



November 1989

DTIC
ELECTED
DEC 26 1989
S B (3) D

prepared for

Commander
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland 21010-5401

prepared by

Environmental Research Division
Argonne National Laboratory
Argonne, Illinois 60439

DISTRIBUTION STATEMENT A

Approved for public release;
Distribution Unlimited

89 12 26 047

NOTICE _____

The views, opinions, and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy, or decision unless so designated by other documentation.

The use of trade names in this report does not constitute an official endorsement or approval of the use of such commercial products. This report may not be cited for purposes of advertisement.

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION Unclassified		1b. RESTRICTIVE MARKINGS										
2a. SECURITY CLASSIFICATION AUTHORITY		3. DISTRIBUTION/AVAILABILITY OF REPORT										
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE		Distribution Unlimited										
4. PERFORMING ORGANIZATION REPORT NUMBER(S)		5. MONITORING ORGANIZATION REPORT NUMBER(S) CETHA-BC-CR-89028										
6a. NAME OF PERFORMING ORGANIZATION Environmental Research Div. Argonne National Laboratory	6b. OFFICE SYMBOL <i>(If applicable)</i> ERD	7a. NAME OF MONITORING ORGANIZATION U.S. Army Toxic & Hazardous Materials Agency	7b. ADDRESS (City, State, and ZIP Code) Attn: CETHA-BC Aberdeen Proving Ground, MD 21010-5401									
8a. NAME OF FUNDING/SPONSORING ORGANIZATION U.S. Army Toxic & Hazardous Materials Agency	8b. OFFICE SYMBOL <i>(If applicable)</i> CETHA-BC	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER U.S. Department of Energy Contract W-31-109-ENG-38										
8c. ADDRESS (City, State, and ZIP Code) U.S. Army Toxic & Hazardous Materials Agency Attn:CETHA-BC Aberdeen Proving Ground, MD 21010-5401	10. SOURCE OF FUNDING NUMBERS <table border="1" style="width: 100%;"><tr><td>PROGRAM ELEMENT NO.</td><td>PROJECT NO.</td><td>TASK NO.</td><td>WORK UNIT ACCESSION NO.</td></tr></table>			PROGRAM ELEMENT NO.	PROJECT NO.	TASK NO.	WORK UNIT ACCESSION NO.					
PROGRAM ELEMENT NO.	PROJECT NO.	TASK NO.	WORK UNIT ACCESSION NO.									
11. TITLE (Include Security Classification) Enhanced Preliminary Assessment Report: Clementon Army Housing Units Clementon, NJ												
12. PERSONAL AUTHOR(S)												
13a. TYPE OF REPORT Final	13b. TIME COVERED FROM _____ TO _____	14. DATE OF REPORT (Year, Month, Day) November, 1989	15. PAGE COUNT 34									
16. SUPPLEMENTARY NOTATION												
17. COSATI CODES <table border="1" style="width: 100%;"><tr><th>FIELD</th><th>GROUP</th><th>SUB-GROUP</th></tr><tr><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td></tr></table>		FIELD	GROUP	SUB-GROUP							18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)	
FIELD	GROUP	SUB-GROUP										
19. ABSTRACT (Continue on reverse if necessary and identify by block number) Argonne National Laboratory has conducted an enhanced preliminary assessment of the Army housing property located in Clementon, NJ. The objectives of this assessment include identifying and characterizing all environmentally significant operations, identifying areas of environmental contamination that may require immediate remedial actions, identifying other actions which may be necessary to resolve all identified environmental problems, and identifying other environmental concerns that may present impediments to the expeditious sale of this property.												
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT. <input type="checkbox"/> DTIC USERS		21. ABSTRACT SECURITY CLASSIFICATION Unclassified										
22a. NAME OF RESPONSIBLE INDIVIDUAL Joseph A. Ricci, Project Officer		22b. TELEPHONE (Include Area Code) (301)671-3461	22c. OFFICE SYMBOL CETHA-BC									

CONTENTS

SUMMARY	1
1 INTRODUCTION	3
1.1 Authority for the PA	3
1.2 Objectives	4
1.3 Procedures	5
2 PROPERTY CHARACTERIZATION.....	6
2.1 General Property Information	6
2.2 Description of Facility	6
2.3 Property History	11
2.3.1 Nike Defense Program and Typical Battery-Level Practices	11
2.3.2 Clementon Housing Units	12
2.4 Environmental Setting and Surrounding Land Use	13
2.5 Geologic and Hydrologic Settings	13
3 ENVIRONMENTALLY SIGNIFICANT OPERATIONS	15
3.1 Transformers	15
3.2 Asbestos	15
3.3 Utility Connections with Former Fire-Control Area	15
4 KNOWN AND SUSPECTED RELEASES	16
5 PRELIMINARY ASSESSMENT CONCLUSIONS	17
6 RECOMMENDATIONS	18
REFERENCES	19
APPENDIX: Photographs of Clementon Housing Facility and Surrounding Land	21

FIGURES

1 Location Map of New Jersey Army Housing Facilities	7
2 Vicinity Map of Clementon Army Housing Units	8
3 Site Plan Map of Clementon Army Housing Units	9

Justification	
By _____	
Distribution/ _____	
Availability Codes _____	
Dist	Avail and/or Special
A-1	

SUMMARY

The Clementon housing area in Camden County, N.J. does not present an imminent or substantial threat to human health or the environment. No evidence suggests that hazardous or toxic materials have ever been released from this area, and no immediate remedial actions are warranted for it. Nevertheless, several potential environmental problems have been identified at the site, and further investigation is recommended.

The housing area was developed as part of a Nike missile battery located near the town of Clementon, N.J. No record exists of any wastes associated with the operation and maintenance of the missile-launch and fire-control systems having been delivered to or managed at this housing property.

The houses have not been used since 1985 and are currently in a poor state of repair because of extensive vandalism.

When the area was in use, potable water and sewage-treatment service were provided by facilities on adjacent land that was once part of the fire-control area of the missile battery. Hearsay reports of possible polychlorinated biphenyl (PCB) contamination in the former fire-control area were obtained during the site visit. The possibility also exists that missile-related contaminants from that area may have migrated along buried water and sewage lines to the housing area.

All appliances, including stoves, ovens, hot water heaters, and furnaces, were fueled by natural gas delivered to the housing units via pipelines owned by the Army and connected to the service provided by a local public utility. No record exists to indicate that underground fuel-storage tanks were ever installed or used on this property.

Electrical service at the Clementon housing area was provided by a local public utility, but transformers on utility poles in the facility are owned by the U.S. government. These transformers are not routinely inspected for possible leakage, and they have never been tested for possible PCB contamination. Potential contamination of soil and groundwater with PCBs from potential leaks or spills associated with these transformers is a concern, although no such spills or leaks were apparent during the site inspection.

The floor tile in one of the Clementon housing units, believed to be the original tile, was tested in a 1988 survey and found to contain asbestos. In many units, the old flooring was replaced when a change of tenant occurred, but the likelihood exists that original flooring is still present in several of them. The same 1988 survey found asbestos in kitchen pipe insulation of the surveyed unit.

Prior to release of this property, two actions are recommended:

- Test the contents of on-site transformers, and sample the soil at the base of transformer poles, to determine the presence of PCBs; label the contents of the transformers; remediate any soil-contamination problems found, as required.

- Test soil in the vicinity of the underground water and sewer lines for the presence of contaminants related to missile operations.

These recommendations assume that this property will most likely resume its use for residential housing. They also assume that only the housing area is to be excessed and that current arrangements for the area with respect to potable water supply and sewage service will end at the time of excessing.

1 INTRODUCTION

In October 1988, Congress passed the Defense Authorization Amendments and Base Closure and Realignment Act, Public Law 100-526. This legislation provided the framework for making decisions about military base closures and realignments. The overall objective of the legislation is to close and realign bases so as to maximize savings without impairing the Army's overall military mission. In December 1988, the Defense Secretary's ad hoc Commission on Base Realignment and Closure issued its final report nominating candidate installations. The Commission's recommendations, subsequently approved by Congress, affect 111 Army installations, of which 81 are to be closed. Among the affected installations are 53 military housing areas, including the Clementon housing area addressed in this preliminary assessment.¹

Legislative directives require that all base closures and realignments be performed in accordance with applicable provisions of the National Environmental Policy Act (NEPA). As a result, NEPA documentation is being prepared for all properties scheduled to be closed or realigned. The newly formed Base Closure Division of the U.S. Army Toxic and Hazardous Materials Agency is responsible for supervising the preliminary assessment effort for all affected properties. These USATHAMA assessments will subsequently be incorporated into the NEPA documentation being prepared for the properties.

This document is a report of the enhanced preliminary assessment (PA) conducted by Argonne National Laboratory (ANL) at the Army stand-alone housing area near Clementon, N.J.

1.1 AUTHORITY FOR THE PA

The USATHAMA has engaged ANL to support the Base Closure Program by assessing the environmental quality of the installations proposed for closure or realignment. Preliminary assessments are being conducted under the authority of the Defense Department's Installation Restoration Program (IRP); the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Public Law 91-510, also known as Superfund; the Superfund Amendments and Reauthorization Act of 1986, Public Law 99-499; and the Defense Authorization Amendments and Base Closure and Realignment Act of 1988, Public Law 100-526.

In conducting preliminary assessments, ANL has followed the methodologies and procedures outlined in Phase I of the IRP. Consequently, this PA addresses all documented or suspected incidents of actual or potential release of hazardous or toxic constituents to the environment.

In addition, this PA is "enhanced" to cover topics not normally addressed in a Phase I preliminary assessment. Specifically, this assessment considers and evaluates the following topical areas and issues:

- Status with respect to regulatory compliance,
- Asbestos,
- Polychlorinated biphenyls (PCBs),
- Radon hazards (to be assessed and reported on independently),
- Underground storage tanks,
- Current or potential restraints on facility utilization,
- Environmental issues requiring resolution,
- Health-risk perspectives associated with residential land use, and
- Other environmental concerns that might present impediments to the expeditious "excessing," or transfer and/or release, of federally owned property.

1.2 OBJECTIVES

This enhanced PA is based on existing information from Army housing records of initial property acquisition, initial construction, and major renovations and remodeling performed by local contractors or by the Army Corps of Engineers. The PA effort does not include the generation of new data. The objectives of the PA include:

- Identifying and characterizing all environmentally significant operations (ESOs),
- Identifying property areas or ESOs that may require a site investigation,
- Identifying ESOs or areas of environmental contamination that may require immediate remedial action,
- Identifying other actions that may be necessary to address and resolve all identified environmental problems, and
- Identifying other environmental concerns that may present impediments to the expeditious transfer of this property.

1.3 PROCEDURES

The PA began with a review of Army housing records at Fort Dix, N.J., during the week of August 7-11, 1989. Additional information was obtained by telephone from the Army Corps of Engineers district office in New York City on August 11, 1989, and from conversations with personnel from the Directorate of Engineering and Housing (DEH) and the Department of Family Housing, Fort Dix, in the period August 7-10. A site visit was conducted at the Clementon housing area on August 10, 1989, at which time additional information was obtained through personal observations of the ANL investigator. The interiors of several units were examined. Photographs were taken of the housing units and surrounding properties as a means of documenting the condition of the housing units and immediate land uses. Site photographs are appended.

All available information was evaluated with respect to actual or potential releases to air, soil, and surface and ground waters.

2 PROPERTY CHARACTERIZATION

2.1 GENERAL PROPERTY INFORMATION

The Clementon housing area is located in southern New Jersey, in south-central Camden County, near the town of Erial, between 1 and 2 miles southeast of the towns of Clementon and Pine Hill, N.J., and about 12 miles southeast of Camden, N.J. The area occupies 6.7 acres,² located in a primarily rural area. The 1980 populations of Erial, Pine Hill, and Clementon were 2,500, 8,684, and 5,764, respectively.³ Land adjacent to the housing area was originally used as the fire-control area for a Nike missile battery. This land was declared excess in 1974;² its current situation is described in Sec. 2.4.

Figures 1 and 2 show the general location of the housing area.²

The housing units were developed in 1958.^{2,4} Twenty-four dwellings, a pumphouse, and a water storage tank were erected on the property. No further major construction has taken place since then. The Army Corps of Engineers district office in New York City is responsible for major renovations or upgrading within the Clementon housing area. The Directorate of Engineering and Housing, Fort Dix, N.J., is responsible for routine maintenance.

2.2 DESCRIPTION OF FACILITY

Figure 3 presents the site plan of the Clementon housing area.⁵

Housing Units

The Clementon housing area consists of 24 "Capehart"-style single-family houses, 11 two-bedroom units (1,036 square feet each) and 13 three-bedroom units (1,200 square feet each).² Capehart is the model name assigned to these houses by the builder, National Homes. The houses are built on concrete slabs, and water lines and air conditioning ducts are embedded in the foundation slab. Asphalt floor tiles are laid over the concrete slab. Interior walls are sheetrock-paneled, and exterior plywood walls are covered with vinyl siding. Roofs are asphalt shingle over wood sheathing. Each house was supplied with a 12 foot x 12 foot aluminum shed on a 4-inch concrete slab in the backyard. An asphalt driveway and concrete pathway connect each house with the street.

The housing area has been vacant since 1985, and the units are in extremely poor condition because of extensive vandalism.^{6,7} An inspection by DEH personnel in 1988 revealed the following situation.⁷ Every house has been broken into, and all exterior doors have been destroyed or made unusable. More than 90% of the interior doors are missing or destroyed. Almost all windows are broken. Kitchen sinks have been disconnected and many removed. Nearly all lavatories and water closets are broken. Approximately half the sheetrock wallboards are broken. All storm doors are missing. Many hot water heaters have been disconnected and overturned. The condition of the furnaces could not be determined. Virtually all the copper wiring and piping that could

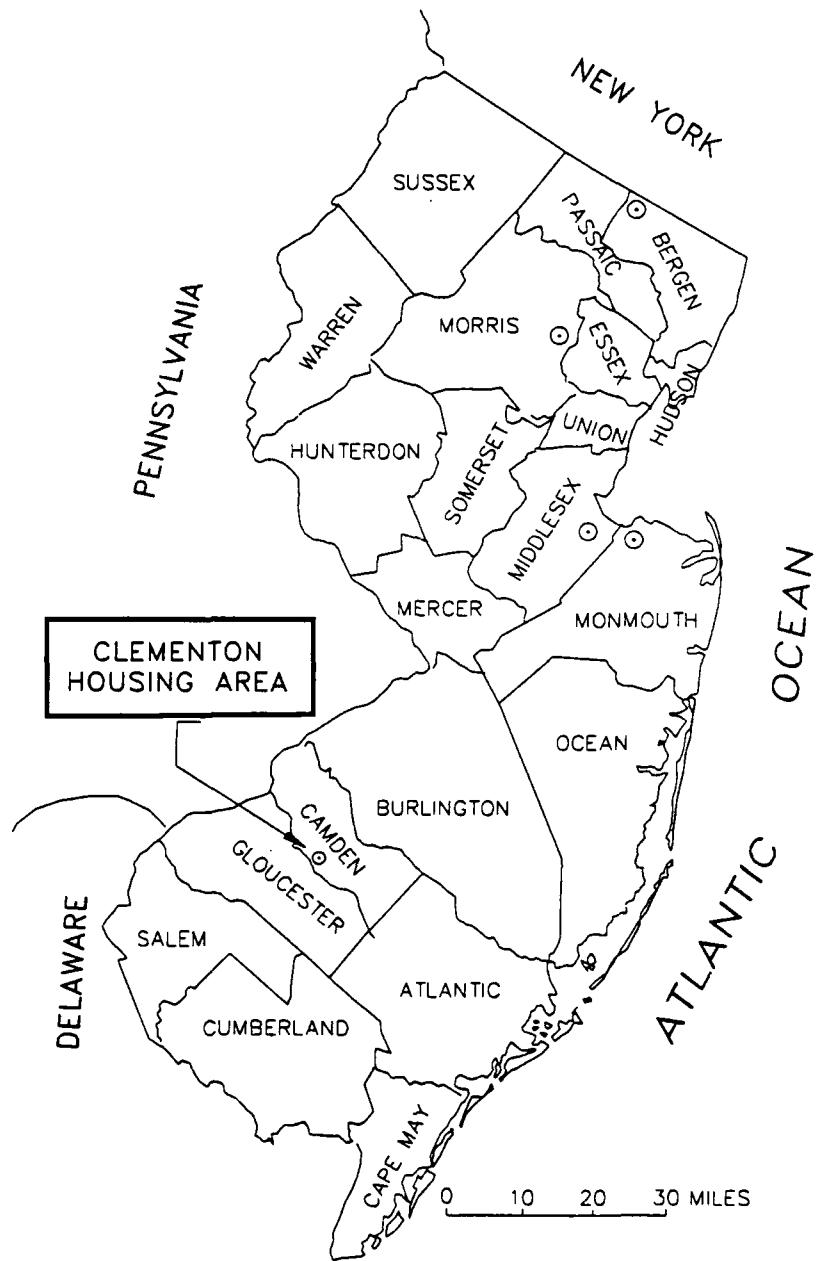


FIGURE 1 Location Map of New Jersey Army Housing Facilities

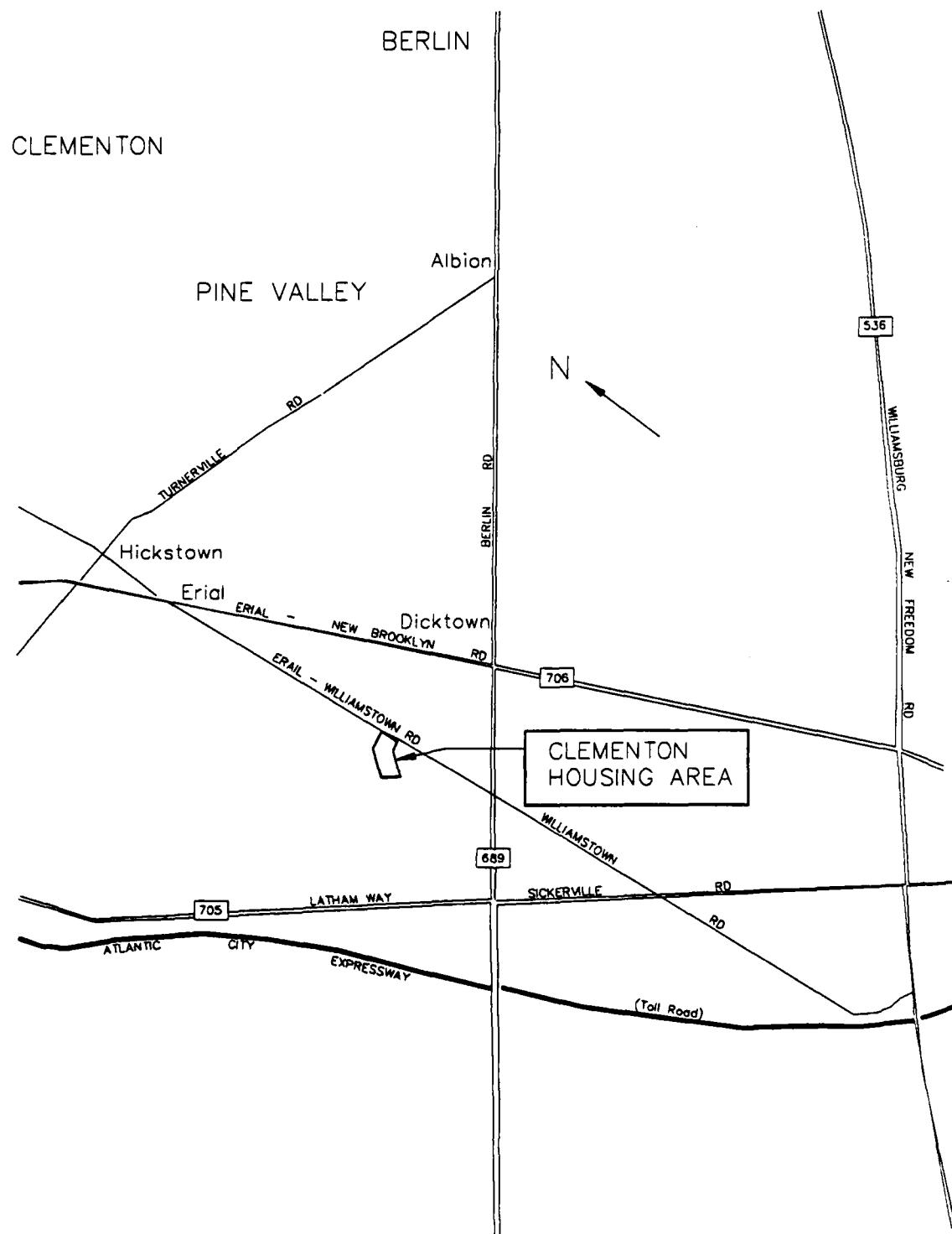


FIGURE 2 Vicinity Map of Clementon Army Housing Units

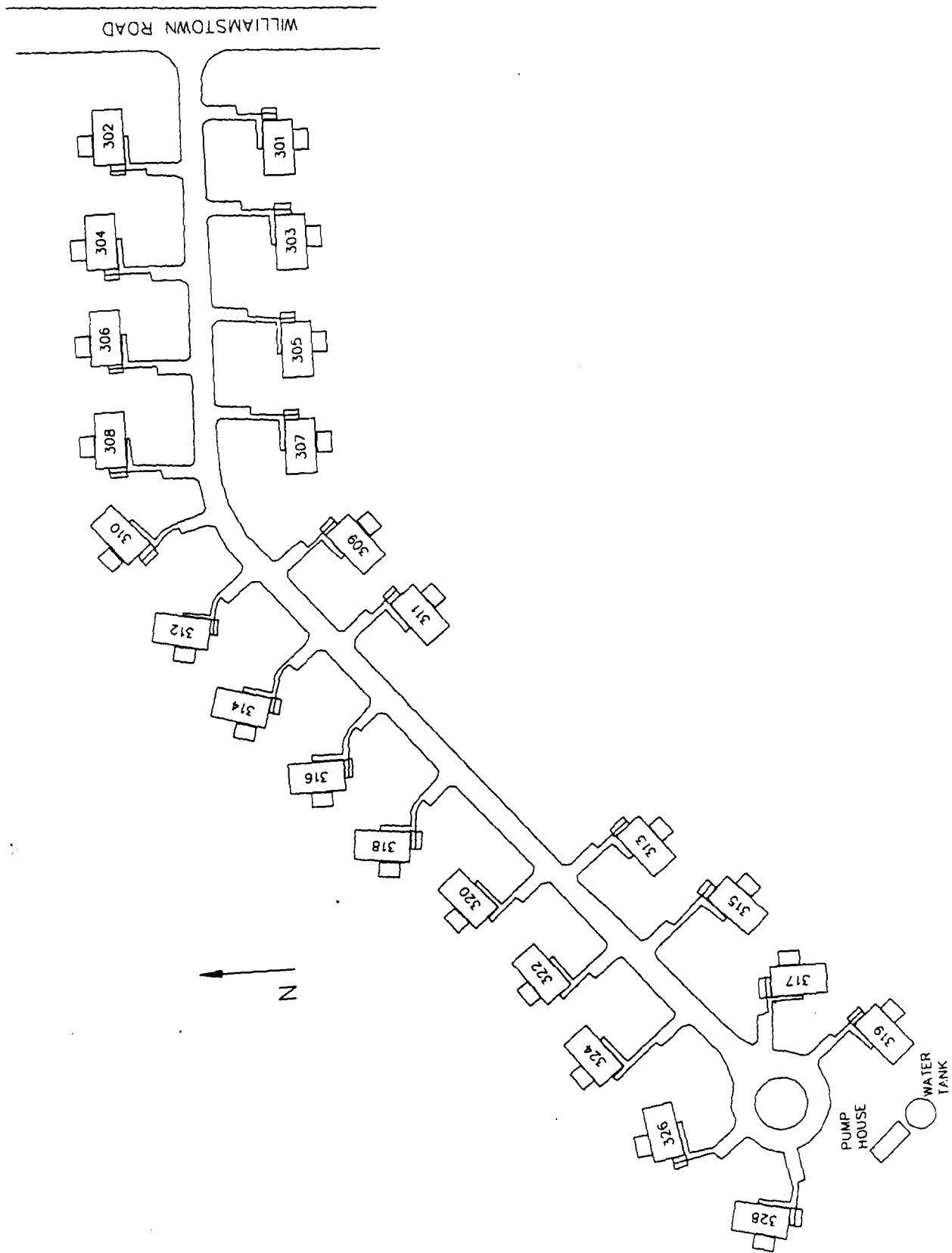


FIGURE 3 Site Plan Map of Clementon Army Housing Units

be removed is missing. All the aluminum sheds are missing. Cost estimates for the rehabilitation of the housing units have been made, and the total exceeds \$300,000 as of January 1988.⁸

Utilities

Since development of the property, the housing units have been supplied with drinking water from a well located on adjacent land that was once part of the fire-control area for the Clementon Nike battery.² As indicated above, a pumphouse and water storage tank were built in the housing area when the area was developed. The well itself, presumably also installed when the houses were built, is located on the adjacent former fire-control area. The Fort Dix DEH had the responsibility for providing potable water to the housing area from its development until 1974, when the former fire-control area was excessed and Camden County assumed the responsibility. Camden County abandoned the site in 1980, and, at the request of the General Services Administration, the DEH then resumed its responsibility for supplying water and sewage treatment service to the housing area.²

The property received electricity from a local public utility, but on-site telephone poles and electrical transformers are the responsibility of the Army.^{9,10}

Sewage

Sewage treatment was provided to the Clementon housing area since its construction by a plant located in the former fire-control area. Responsibility for providing this service rested with the DEH until 1974, when the fire-control area was excessed and Camden County took it over. As indicated, the DEH reassumed responsibility for providing treatment in 1980. During the time that the DEH had responsibility, all sewage sludge was transported to Fort Dix for disposal.² The treatment plant does not meet U.S. EPA standards, and the cost of bringing the facility up to current standards is considered prohibitive.² The plant has been shut down since 1985. A new municipal sanitary sewer line now exists approximately 500 feet from the housing area, making connection to the municipal services feasible if the need arises.

Fuel Storage

All appliances used in the Clementon housing area were fueled by natural gas provided by a local public utility. No evidence of the existence of any fuel-oil storage tanks on-site was found.

Storm Drainage Systems

The property is drained simply, by surficial runoff down the natural contours of the property. Surficial runoff is in a generally south-southeast direction.

Other Permanent Structures or Property Improvements

Property improvements include external lighting for the area, paved roads and driveways, an overhead electrical distribution system, and a chain-link fence around the property.²

2.3 PROPERTY HISTORY

2.3.1 Nike Defense Program and Typical Battery-Level Practices

Generic information on the national Nike antiaircraft defense program has been compiled in two studies, one commissioned by the Army Corps of Engineers¹¹ and the other by the U.S. Army Toxic and Hazardous Materials Agency.¹² In both studies, independent contractors relied on information contained in unclassified documents related to the Nike surface-to-air missile program, including engineering drawings and specifications (for the facilities and the missiles themselves), interviews with Army personnel participating in the Nike program, and operations manuals and directives relating to the operations and maintenance of Nike facilities. Taken together, these two reports represent the most complete assemblage of generic information on the Nike missile program from an environmental perspective. Salient points from both reports are condensed below.

At its zenith in the early 1960s, the Nike program included 291 batteries located throughout the continental United States. The program was completely phased out by 1976, with many of the properties sold to private concerns or exceded to state or local governments for nominal fees.

Nike Ajax missiles were first deployed in 1954 at installations throughout the continental United States, replacing, or in some cases augmenting, conventional artillery batteries and providing protection from aerial attack for strategic resources and population centers. Typically, Nike batteries were located in rural areas encircling the protected area. The Ajax was a two-stage missile using a solid-fuel booster rocket and a liquid-fuel sustainer motor to deliver a warhead to airborne targets.

The Ajax missile was gradually replaced by the Nike Hercules missile, introduced in 1958. Like the Ajax, the Hercules was a two-stage missile, but it differed from the Ajax in that its second stage was a solid-fuel rather than liquid-fuel power source and its payload often was a nuclear rather than conventional warhead. Ajax-to-Hercules conversions occurred between 1958 and 1961 and required little change in existing Nike battery facilities. A third-generation missile, the Zeus, was phased out during development and consequently was never deployed.

A typical Nike missile battery consisted of two distinct and separate operating units, the launch operations and the integrated fire control (IFC) operations. The two operating areas were separated by distances of less than two miles, with lines of sight between them for communications purposes. A third separate area was also sometimes part of the battery. This area was typically equidistant from the two battery operating

sites and contained housing for married personnel assigned to the battery. Occasionally, these housing areas also contained battalion headquarters, which were responsible for a number of Nike batteries.

Depending on area characteristics and convenience, the housing areas were often reliant on the launch or IFC sites for utilities such as potable water, electrical power, and sewage treatment. In those instances, buried utility lines connected the housing area to one or both of the other battery properties. It is also possible, however, that housing areas were completely independent of the missile launcher and tracking operations. In those instances, the necessary utilities were either maintained on the housing site or purchased from the local community. In many localities, as the character of the land area around the housing units changed from rural to suburban or urban, communities extended utility services to the housing unit locations, in which case conversions from independent systems to community systems were made.

A large variety of wastes was associated with the operation and maintenance of Nike missile batteries. Normally encountered wastes included benzene, carbon tetrachloride, chromium and lead (contained in paints and protective coatings), petroleum hydrocarbons, perchloroethylene, toluene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, and trichloroethylene. Because of the rural locations of these batteries, and also because very few regulatory controls existed at that time, most of these wastes were managed "on-site." (Unused rocket propellants and explosives, however, would always have been returned to central supply depots and not disposed of on-site.) It is further conceivable that wastes generated at one of the Nike properties may have been transferred to its companion property for management or disposal.

Wastes related to missile operation and maintenance would not have been purposely transferred from a battery operating area to a housing area with no facilities for waste management or disposal. In some instances, however, the sewage treatment facilities for all Nike battery properties were located at the housing area; that possibility cannot be automatically ignored. Finally, where housing areas received various utilities from either of the operating areas, it is also possible that wastes disposed of on those other properties may have migrated to the housing area via the buried utility lines. And since decommissioning of the Nike batteries did not normally involve removal of buried utility or communication lines, any such contaminant migration is likely to have gone unnoticed.

2.3.2 Clementon Housing Units

The Clementon housing area was developed to provide stand-alone family housing for military personnel assigned to the local Nike battery. Twenty-four single-family houses, a pumphouse, and water tank were erected on the property. After decommissioning of the Nike battery in the early 1970s, this area continued to be used as housing for active duty military personnel until 1985, when it was vacated.

Since initial property development, no other permanent structures have been added, and none of the original structures has been razed. Several property improvements were made before the area was vacated in 1985. These include installing 4,300 feet of sewer line in 1983 and paving the road in 1985.²

2.4 ENVIRONMENTAL SETTING AND SURROUNDING LAND USE

The Clementon housing area is located in a relatively flat, primarily rural area. The area contains many farms, scattered farmhouses, occasional residential developments, and much open land.

The former fire-control area of the local Nike missile battery lies immediately southeast of the housing area. This parcel of land is currently unused but still under federal government control.⁹ It is covered by a thick growth of weeds. Several structures in poor condition are visible from the housing area. Hearsay reports from DEH personnel at Fort Dix indicate that PCB contamination has been detected somewhere within the former fire-control area. No further information or confirmatory documentation regarding this or any other environmental problems in the fire-control area was available during the site visit. A large hole is cut in the chain-link fence that separates this property from the housing area.

Immediately west of the housing area is a large sand and gravel quarry; the quarry essentially borders the housing area along its southwest and northwest boundaries. A dropoff into the quarry's excavation has encroached almost into the housing area. A survey marker that had been positioned just outside a gate at the western corner of the property has disappeared, and the corner of the fence is right at the edge of the excavation.

A new elementary school was built in 1986 about 500 feet north of the Clementon housing area along Williamstown-Chews Landing Road, the road providing access to the housing area. Across the road from the Clementon units, private residential housing is under construction.

2.5 GEOLOGIC AND HYDROLOGIC SETTINGS¹³⁻¹⁵

The Clementon housing area is situated within the Atlantic Coastal Plain Physiographic Province, which is characterized by flat to gently rolling terrain and generally low elevations that decrease gradually in a southeasterly direction. The line of demarcation (fall line) between the Atlantic Coastal Plain and the adjacent Piedmont Physiographic provinces bisects New Jersey in a southwesterly direction. This fall line begins at the western end of Raritan Bay, passes through the city of Trenton, and roughly follows the west bank of the Delaware River. The coastal plain, which lies southeast of the fall line, is underlain by a wedge of sedimentary rocks that have been deposited during periods of elevated sea level. The rocks range in age from the Cretaceous period (approximately 100-135 million years ago) to the present. The thickness of the sedimentary rocks increases in a southeasterly direction, from near zero along the fall line to approximately 6,500 feet near the tip of Cape May in southern New Jersey. Sedimentary deposits near the Clementon housing area are approximately 1,000 feet thick.

The sedimentary deposits that underlie the New Jersey coastal plain form one interrelated aquifer system that includes five major aquifers and adjacent confining layers. In the vicinity of the Clementon housing area, the Potomac-Raritan-Magothy

aquifer system lies unconformably atop the pre-Cretaceous basement rock; the system is overlain by the Woodbury Clay and Merchantville formations, which form a confining layer. Above these lies the Englishtown aquifer, then a thin confining layer (about 15 feet thick), the Marshalltown Formation. These are followed by the Wenonah-Mt. Laurel aquifer system; then by the Navesink, Red Bank and Tinton formations, which form a porous confining layer. All formations up to this point are of Cretaceous age. Above all of these lie Tertiary formations; the Hornerstown Sand, Vincentown, and Manasquan formations; the Shark River Marl; the Piney Point Formation; and basal clay of the Kirkwood Formation -- together, these formations act as another confining layer. The Kirkwood Formation itself includes two major aquifers. The lower is the "principal artesian," or Atlantic City "800 foot," aquifer. The upper aquifer is hydrologically connected with the next formation (Cohansey Sand), and together these form a major aquifer system in which groundwater generally occurs under water-table conditions. The Cohansey Sand outcrops in eastern Camden County and may not be present in the vicinity of the Clementon housing area.

In Camden County, 95% of all major groundwater withdrawals are taken from the Potomac-Raritan-Magothy system, although this situation may reflect very large withdrawals by the cities of Camden and Philadelphia, Pa., in and near the western edge of the county. The Kirkwood-Cohansey aquifer system is of increasing importance in the eastern parts of the county. In Atlantic County, for example, just east of Camden County, 99% of the groundwater is taken from the Kirkwood and Kirkwood-Cohansey aquifers because of the increasingly high salinity of the Potomac-Raritan-Magothy water.

3 ENVIRONMENTALLY SIGNIFICANT OPERATIONS

3.1 TRANSFORMERS

Electrical service to the Clementon housing area was provided by a local public utility, but all transformers located on-site are still the responsibility of the Army.^{9,10} No record of any inspection of these transformers for leakage or of any testing of their contents for the presence of PCBs was found. However, no evidence of spills or leaks was observed during the site visit.

3.2 ASBESTOS

The original floor tile used in the Clementon houses has been found to contain asbestos during a survey done on one unit in 1988.¹⁶ Although the old flooring was systematically replaced in recent years whenever a change of tenant occurred, some of it still remains. During the site visit by the ANL investigator, old 9-inch tiles of the type originally used were observed in one unit inspected. In addition, the 1988 survey found asbestos in the kitchen pipe insulation of the surveyed unit.

3.3 UTILITY CONNECTIONS WITH FORMER FIRE-CONTROL AREA

The housing area received potable water and sewage treatment service from facilities located in the adjacent former fire-control area.² The possibility exists that missile-related contaminants may have migrated along the old buried utility lines from the fire-control area into the housing area.

4 KNOWN AND SUSPECTED RELEASES

No major releases or impacts to the environment are known to have occurred at the Livingston housing area. No hazardous wastes or other hazardous materials are stored on-site.

5 PRELIMINARY ASSESSMENT CONCLUSIONS

Although these housing units were originally developed in support of a Nike missile battery, no Nike-related wastes were delivered to this property for management or disposal. Since this property was connected with the adjacent fire-control area of the Nike battery by buried potable water and sewage lines, however, the migration of missile-related contaminants along those buried lines is a possibility.

The original flooring material in these housing units has been found to contain asbestos. Although the old flooring has been replaced in many of the units, it is still present in some units. Asbestos has also been found in the kitchen pipe insulation in one unit. However, both floor tiles and pipe insulation materials were found to be in good condition.

Real property records indicate that no fuel-oil storage tanks, either underground or above-ground, were ever in use at the Clementon housing area. There is no concern, therefore, regarding possible release of fuel oil at this facility.

Although electrical service was provided to the Clementon housing area by a local public utility, the on-site transformers, installed when the housing area was built, have always been the responsibility of the Army as regards inspection and maintenance. The possible presence of PCBs in these transformers has never been investigated, nor are the transformers routinely inspected for leakage, although no such leakage was apparent at the time of the site visit.

6 RECOMMENDATIONS

It is recommended that on-site electrical transformers be surveyed for PCBs and possible leakage and that soil at the base of transformer poles be inspected for possible contamination. Any transformers found to contain PCBs should be labeled as such, and PCB-contaminated soils should be remediated as required.

Since the housing area is connected by buried utility lines to land that was at one time part of the Nike battery's operational area, it is recommended that soil along these lines be sampled and tested for the presence of missile-related contaminants.

These recommendations assume that this property will most likely resume its use for residential housing. They also assume that only the housing area is to be excessed and that current arrangements for the area with respect to potable water supply and sewage service will end at the time of excessing.

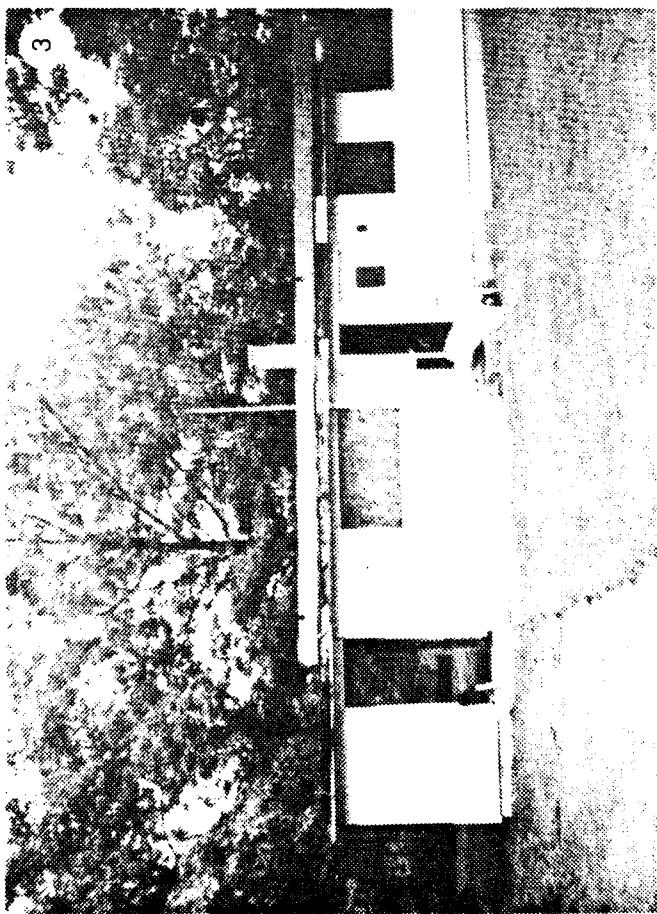
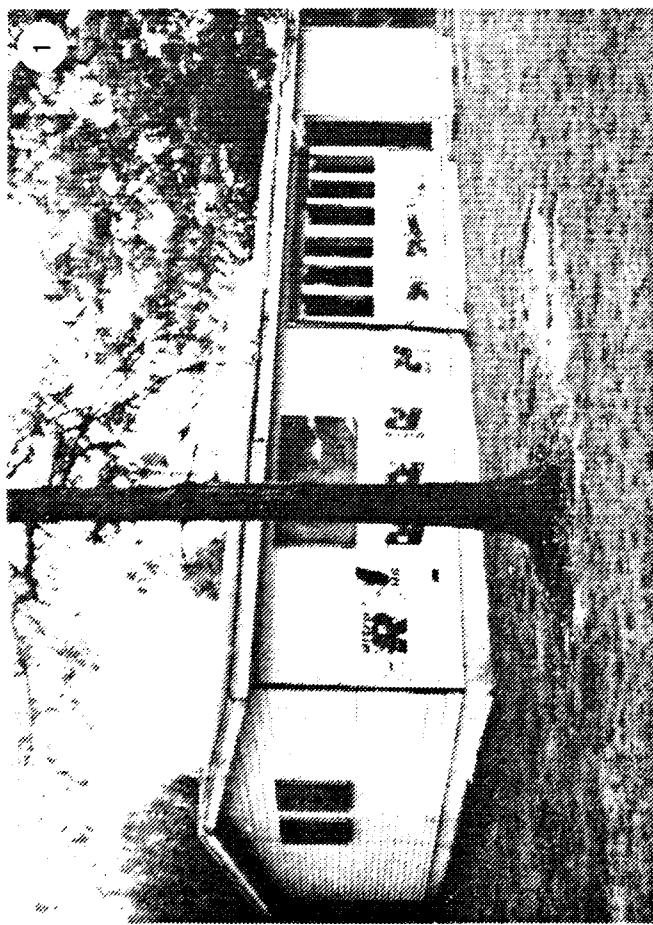
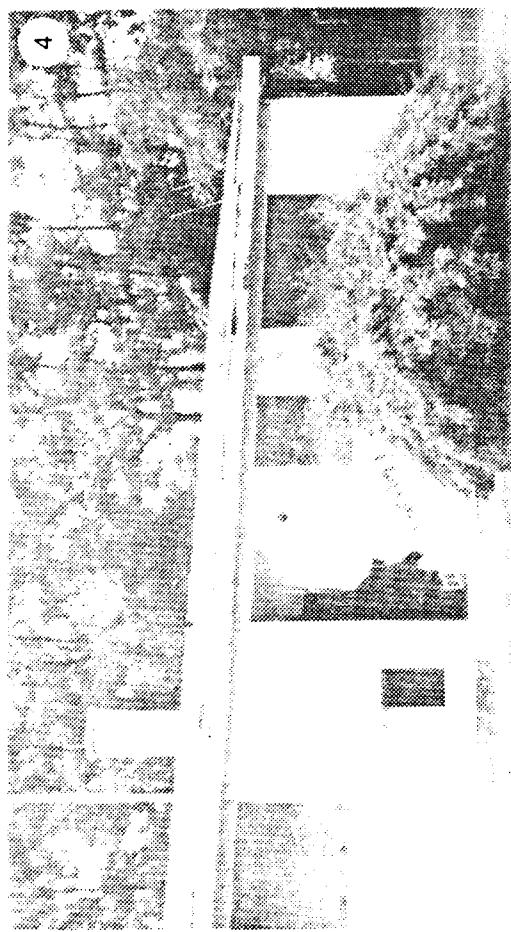
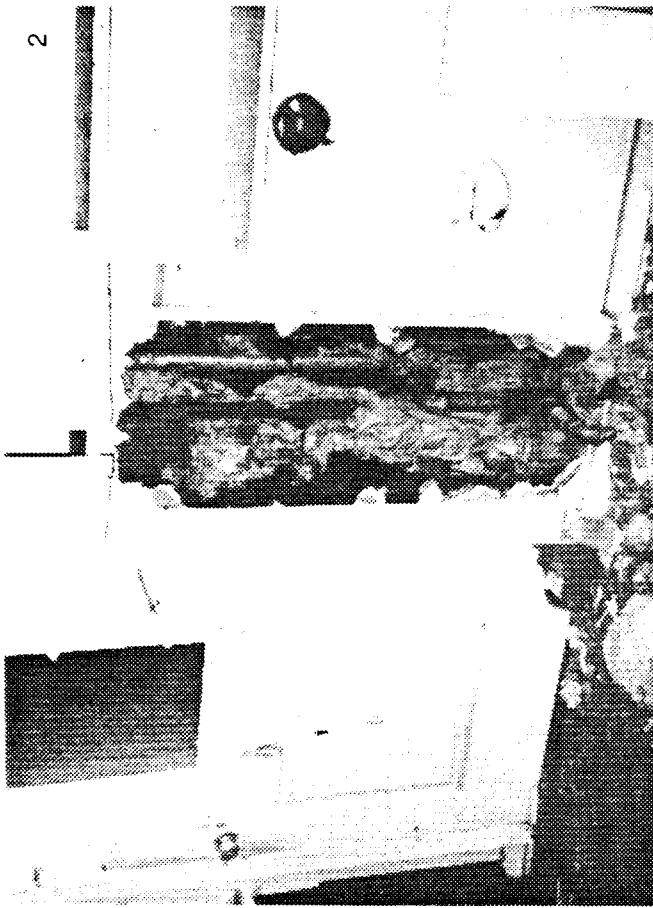
REFERENCES

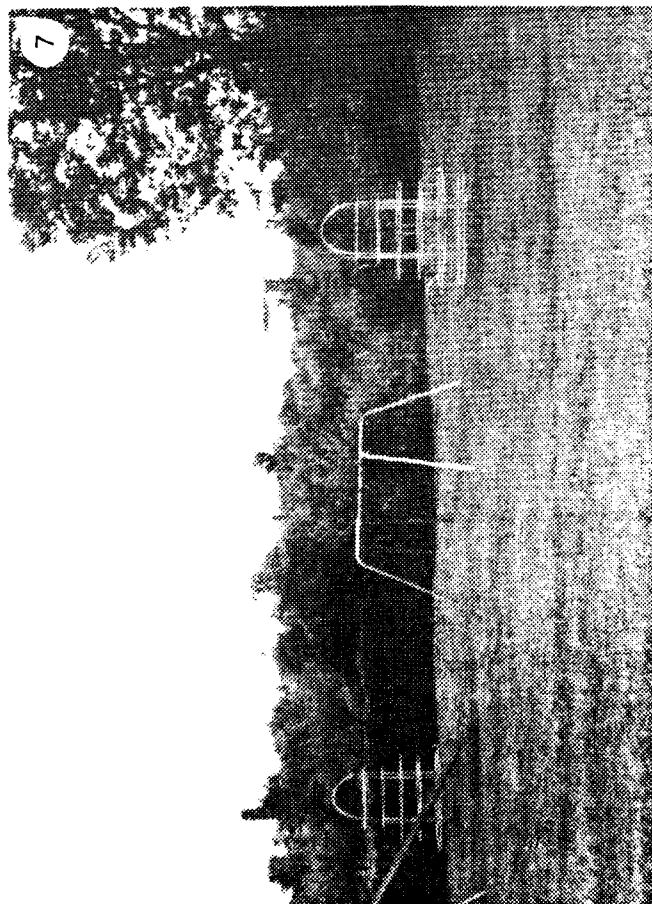
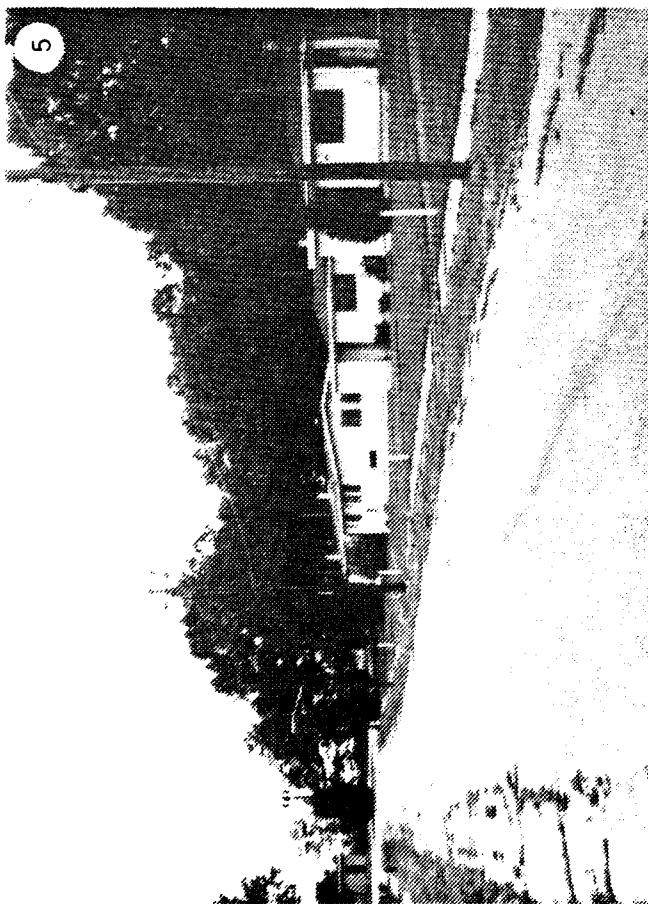
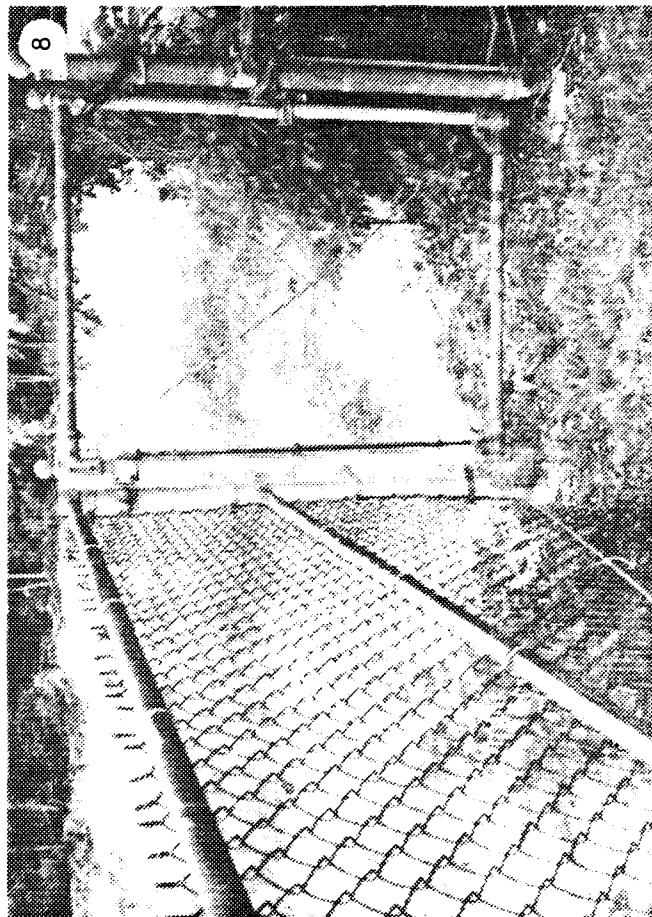
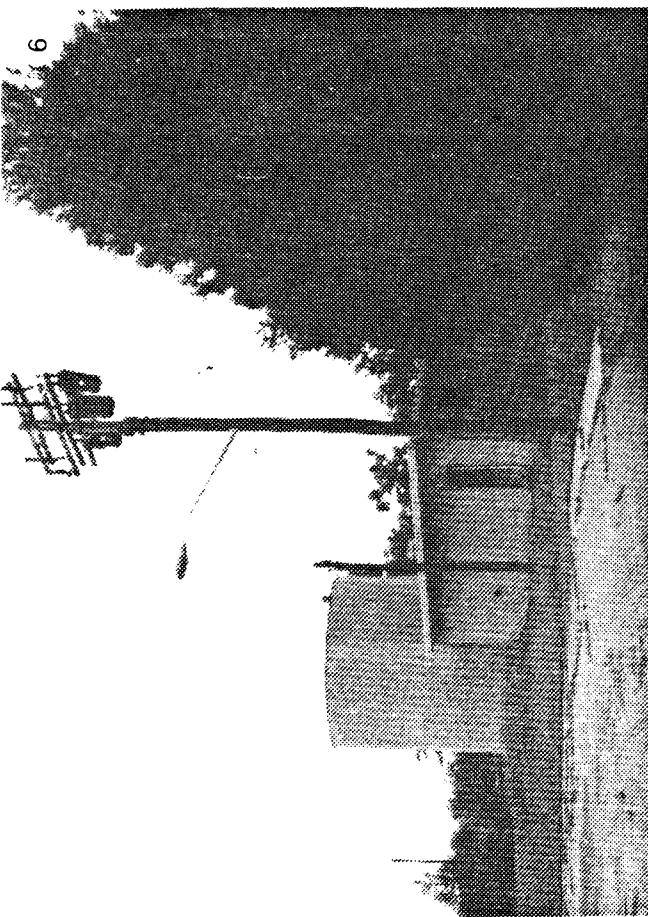
1. *Base Realignments and Closures*, Report of the Secretary's Commission (Dec. 1988).
2. *Report of Excess*, Installation Number 34741, NIKE PH 41/43 Family Housing Area, Directorate of Engineering and Housing, Fort Dix, N.J. (March 18, 1983).
3. *1988 Rand McNally Commercial Atlas and Marketing Guide*, 119th Ed., Rand McNally & Company, Chicago (1988).
4. *Real Property Record*, Special AAA Site PH-41-43-CL Camden County, N.J., Directorate of Engineering and Housing, Fort Dix, N.J. (Aug. 22, 1958).
5. *Site Plan of Clementon Housing Area (Site PH-41)*, blueprint, U.S. Army Training Center and Fort Dix, Directorate of Engineering and Housing, Fort Dix, N.J. (June 1, 1982).
6. *Survey Report - Clementon Family Housing Annex*, Office of Real Estate Sales, Federal Property Resources Service, General Services Administration (Dec. 2, 1987).
7. *Report of Inspection - Clementon Housing Area*, by Harry E. Colbert, Civil Engineer (Jan. 19, 1988).
8. Memorandum, Directorate of Engineering and Housing, Fort Dix, N.J. (undated).
9. Directorate of Engineering and Housing, Fort Dix, N.J., personal communication (Aug. 7, 1989).
10. Directorate of Family Housing, Fort Dix, N.J., personal communication (Aug. 7, 1989).
11. U.S. Army Corps of Engineers, Huntsville Div., *Investigation of Former Nike Missile Sites for Potential Toxic and Hazardous Waste Contamination*, Law Engineering and Testing Co., LEG-Government Services Division, LEG Job #601 (March 1986).
12. U.S. Army Toxic and Hazardous Materials Agency, *Historical Overview of the Nike Missile System*, prepared by B.N. McMaster et al., Environmental Science and Engineering, Inc., for USATHAMA Assessments Div., Aberdeen Proving Ground, Md. (Dec. 1984).
13. Volwinkel, E.F., and W.K. Foster, *Hydrogeologic Conditions in the Coastal Plain of New Jersey*, U.S. Geological Survey Open File Report 81-405, USGS, Trenton, N.J. (April 1981).

14. Fusillo, T.V., *Impact of Suburban Residential Development on Water Resources in the Area of Winslow Township, Camden County, New Jersey*, U.S. Geological Survey Water Resources Investigation 81-27, USGS, Trenton, N.J. (1981).
15. *New Jersey Surface Water Resources*, U.S. Geological Survey Water Supply Paper 2300, USGS, Reston, Va. (undated).
16. Memorandum to Directorate of Engineering and Housing, Fort Dix, N.J., from Jean Johnson, Real Property Officer, Subject: Clementon Family Housing Annex, Gloucester Township, Camden County, New Jersey GSA Inventory (undated).

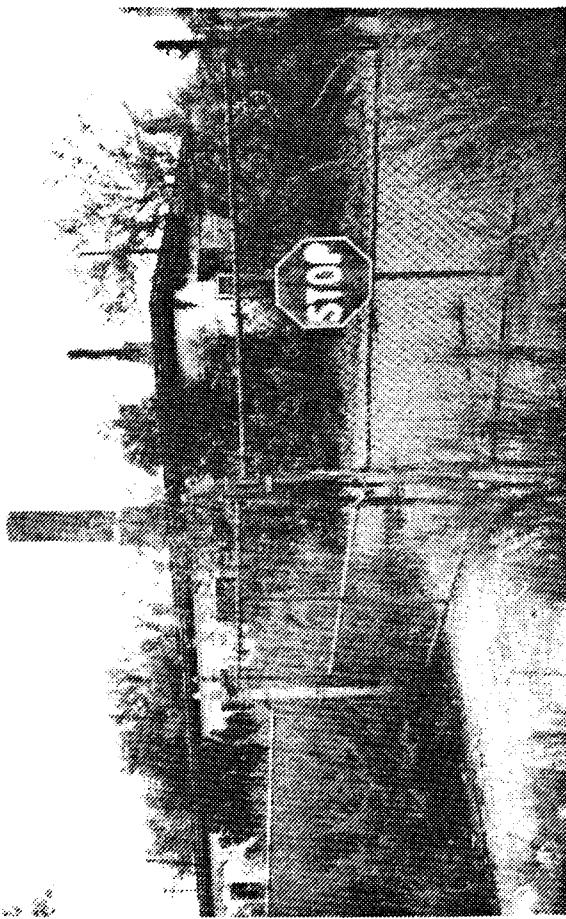
APPENDIX:

**PHOTOGRAPHS OF CLEMENTON HOUSING FACILITY
AND SURROUNDING LAND**





10



9



IDENTIFICATIONS OF PHOTOGRAPHS

1. A vandalized housing unit exterior; the housing units at this site are not occupied.
2. A vandalized kitchen in one of the units.
3. Water tank inside one of the units on its side and protruding through an open door, again the aftermath of vandalism; wooded areas surround the housing units, as seen here.
4. Open front entrance of an unoccupied housing unit.
5. A southeast view along the main street of the housing area; at the end of the street (far left of view), is the pumphouse; transformers atop a utility pole can also be seen.
6. Closer view of the pumphouse, water tank, and transformers; the transformers are owned by the U.S. government.
7. Playground inside the housing area; in the background is a concrete structure located in the old Nike fire-control area, adjacent to the housing site.
8. The fence and the gate are at the southeast corner of the housing property; just beyond the fence is a gravel quarry, whose excavated area reaches the fence.
9. Another view of the gravel quarry and the concrete structure (top left of view) at the former fire-control area.
10. The locked gate is at the entrance to the former fire-control area, which is adjacent to the housing site.